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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/613,749 07/11/00 SUZUKI

S 400762/ADYAM

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MM91/1019

EXAMINER

RAO, S

ART UNIT

PAPER NUMBER

2814

DATE MAILED:

10/19/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/613,749

Applicant(s)

SUZUKI ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Applicants' amendment of July 31, 2001 has been entered on August 08, 2001.

Therefore claims 1-6 and 8-13 as recited in the preliminary amendment of July 11, 2000 and claim 7 as originally filed are currently pending in the application.

Election/Restrictions

Applicants' election of claims 1-13 without traverse in Paper No. 7 is acknowledged.

Non-elected Claims 14-~~16~~¹⁷ are withdrawn from further consideration pursuant to 37CFR 1.142(b).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui (U.S. Patent No. 5,925,901, herein after Tsutsui) and Tozawa Tadayuki (Japanese Patent Publication No. 43270024A, herein after Tozawa).

With respect to claim 1, Tsutsui describes a semiconductor device including :

A semiconductor substrate having first and second surface (fig. 7 and 8, Col. 4 lines 3-5), an active region formed on the first surface of the substrate (Fig. 7, col. 4 lines 9-12).

Tsutsui does not specifically mention a first and second channel having width directions substantially perpendicular to each other.

However, Tozawa In figs. describes first and second channel regions having width directions substantially perpendicular to each other to increase output without increasing the chip size .

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Tozawa's channel regions having width directions substantially perpendicular to each other for Tsutsui's channel regions to increase output without increasing the chip size . (Tozawa abstract lines 1-4).

A first source electrode and a first drain electrode adjacent to the first and second channel regions and opposing each other with the first and second channel regions there between and which is in ohmic contact with the active region (Tozawa figs.).

A first gate electrode on the first and second channel regions and along the first source electrode and the first drain electrode and bent at least at one bending position (Tozawa figs. 1 # 1,2 or 3 on the channels and along source electrode 3 and drain electrode 1).

A second semiconductor element on the active region adjacent first semiconductor element (Tozawa fig. 1 left hand side element(LHS) of 1A) including third and fourth channel regions adjacent to the first and second channel regions, respectively, with one of the first source electrode and the first drain electrode there between (Tozawa fig. 1 LHS) one of a second source electrode and a second drain electrode opposing first drain electrode or the first source electrode across third and

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fourth channel regions and in ohmic contact with the active regions (Tozawa fig. 1, mentioning interconnection part #A fig.1 b).

Third and fourth channel regions adjacent first and second channel regions respectively with one of the first source electrode and the first drain electrode there between (Tozawa Fig. 1a) and one of second source electrode and a second drain electrode opposing the first drain electrode or the first source electrode (Fig. 1 a --see different zigzag portions of electrodes 1 and 3) across the third and fourth channel region and in ohmic contact with the active region (Tozawa Fig.1 a left hand side).

A second gate electrode on the third and fourth channel regions and along one of the second source electrode and the second drain electrode and bent at, at least one bending position. (Tozawa Fig. 1a).

With respect to claim 2, Tsutsui and Tozawa describe a semiconductor device including : source and drain electrodes are band-like electrodes (Tozawa fig. 1a) and bending position of the first and second electrodes lie on a straight line substantially parallel with a longer side of the active region. (Tozawa fig. 1a and b).

With respect to claim 3, Tsutsui and Tozawa describe a semiconductor device including : a source-drawing wire on the first source electrode and along the first source electrode, a source common wire connected to the source-drawing wire, a drain-drawing wire on the first drain electrode and along the first drain electrode, a drain common wire connected to the drain-drawing wire and a gate common wire connected to the first gate electrode wherein the drain common wire is opposite the source common wire and the gate common wire across the active region and wherein the

source-drawing wire is connected to the source common wire through an air bridge extending across the gate common wire. (Tozawa fig. 2 and Tsutsui figs. 7 and 11, etc.) .

With respect to claim 4, Tsutsui and Tozawa describe a semiconductor device including : insulating regions on the semiconductor substrate and under the bending position of the first gate electrode and the bending position of the second gate electrode (Tsutsui figs. 7, 8 # 4, Tozawa fig.2).

With respect to claim 5, Tsutsui and Tozawa describe a semiconductor device including : wherein the first source electrode has a rectangular shape , two sides of which are adjacent to the first and second channel regions , respectively and wherein the first source electrode is connected to a conductive film on the second surface of the semiconductor substrate through a via hole in the first source electrode (Tsutsui fig. 1 ,etc. and Tozawa fig. 2).

With respect to claim 6, Tsutsui and Tozawa describe a semiconductor device including : it recites the same elements as claim 4 and therefore is rejected for the same reasons.

With respect to claim 7, Tsutsui and Tozawa describe a semiconductor device including : wherein the insulating region is formed so that the width of the first and second channel region is narrower than the width of the source electrode adjacent to the channel region. (Tsutsui fig. 1, etc. and Tozawa fig. 1a).

With respect to claim 8, Tsutsui and Tozawa describe a semiconductor device including : wherein the first gate electrode has two bending positions at which the first

gate electrode is bent, the first gate electrode being bent in the opposite direction at the two bending positions and wherein the second gate electrode has two bending positions at which the second gate electrode is bent so that the second gate electrode extends substantially at a uniform spacing from the first gate electrode (Tozawa fig. 1a).

With respect to claim 9, Tsutsui and Tozawa describe a semiconductor device including : wherein the first and the second gate electrodes are parallel to each other and are connected to a common pad electrode at a bending portion of the first and second gate electrodes. (Tozawa figs. 1a and 2)

With respect to claim 10, Tsutsui and Tozawa describe a semiconductor device including : wherein the semiconductor substrate is an electrically isotropic compound i.e. Gallium Arsenide (Tozawa constitution line 4 – GaAs substrate).

With respect to claim 11, Tsutsui and Tozawa describe a semiconductor device including : wherein the first and second gate electrodes share one of a first source or drain electrode (Tozawa fig. 1a and Tsutsui fig. 1 and 7, etc.).

With respect to claims 12 and 13, Tsutsui and Tozawa describe a semiconductor device including : wherein the first gate electrode is bent at a right angle at a bending position (cl. 12 – see Tozawa fig. 1a) and an angle is formed between a width direction of the first gate electrode and a longer side of the active region is substantially 45 degrees (cl. 13-see Tozawa fig. 1 a).

Any inquiry concerning this communication should be directed to Steven H. Rao at telephone number 703-306-5945.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703- 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703- 308-0956.

SK
10/11/01



Olik Chaudhuri
Supervisor, Patent Examiner
Technology Center 2000